

Three new species of Phalangiidae (Arachnida: Opiliones) from Turkmenistan

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Abstract — The paper presents descriptions of three new opilionid species: *Egaenus turkmenicus* sp.n. (♂♀), *Phalangium kopetdagensis* sp.n. (♂♀) and *Graecophalangium karakalensis* sp.n. (♂♀) from Turkmenistan. All species are diagnosed, described, figured, and their distributions are mapped.

Key words — Opiliones, new species, Turkmenistan.

Introduction

Despite comparatively sufficient knowledge on the Opiliones of Central Asia, the opilionid fauna of Turkmenistan remains poorly studied. To date, limited data on the harvestmen of Turkmenistan can be found in the papers by Gricenko (1979), Staręga (2003) and Tchemeris & Logunov (2000). Today from Turkmenistan is known only 7 opilionids belonging to family Phalangiidae: *Opilio aghanus* Roewer, 1960; *Opilio lepidus* (L. Koch, 1878); *Egaenus lindbergi* (Roewer, 1960); *Homolophus betpakdalensis* (Gricenko, 1976); *Scleropilio armatus* (Roewer, 1911) and *Rilaena hyrcana* (Thorell, 1876). The present paper is devoted to descriptions of three new species (*Egaenus turkmenicus* sp.n., *Phalangium kopetdagensis* sp.n. and *Graecophalangium karakalensis* sp.n.) from Turkmenistan.

The types and other collected and examined specimens are shared between the following depositories: ISEA=Zoological Museum, Institute for Sistematics and Ecology of Animals, Novosibirsk, Russia (Dr G. N. Azarkina); ZMMU=Zoological Museum of Moscow State University, Russia (Dr K. G. Mikhailov).

Abbreviations used in the text and tables: Fm=femur, Mt=metatarsus, Pt=patella, Tb=tibia, Tr=trochanter, Ts=tarsus. ‘Clypeus’ is the space between the ocularium and the front margin of the carapace. All measurements are in mm.

Descriptions

Family Phalangiidae

Egaenus turkmenicus sp. n.

(Figs. 1–9, 35)

Male (holotype). Body length 6.72, width 4.19. Body of medium size, oval and robust (Fig. 1). Cephalothorax

length 1.92, clypeus length 1.10. Carapace with rare black-tipped denticles, situated in groups on the edges of carapace and in transverse rows on the thoracic tergites (Fig. 1). Carapace in front of the ocularium with seta only. Odoriferous glands visible. Eye tubercle width 0.53.

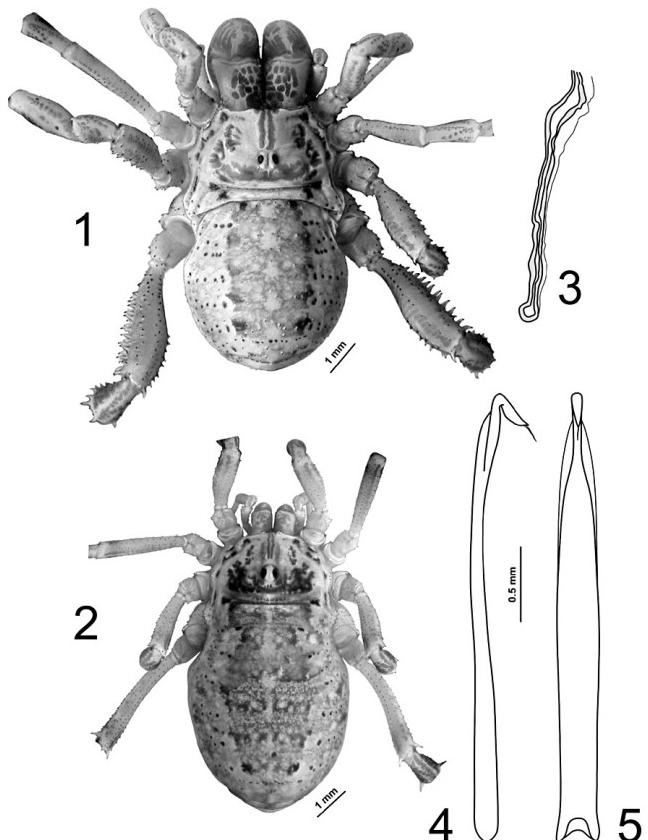


Fig. 1–5. *Egaenus turkmenicus* sp. n.: 1 — male body, dorsal view; 2 — female body, dorsal view; 3 — seminal receptacles; 4 — penis, lateral view; 5 — penis, dorsal view;

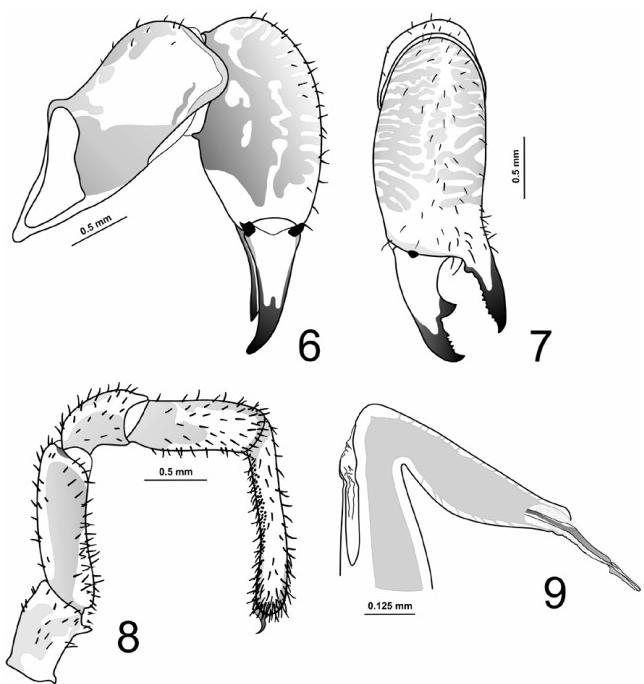


Fig. 6–9. *Egaenus turkmenicus* sp. n.: 6 — male chelicera, ectal view; 7 — distal segment of male chelicera, dorsal view; 8 — male palp, mesal view; 9 — glans of penis, lateral view.

Ocularium stocky (Fig. 1), dorsally with 4 setae on each side. Supra-cheliceral lamella narrow without arming, invisible in dorsal view. Carapace light ochre, with dark ochre pattern and brown spots. Abdomen dorsally with transverse rows of black-tipped denticles. Body ochre, with well defined light-brown saddle-pattern. Abdominal tergites on sides with saddle-pattern and with row of round brown spots. Chelicera large and robust (Figs. 1, 6–7). Basal and distal segments 2.68 and 2.07 long, swollen (in dorsal view), not armed. Length of chelicera 1.57. Chelicerae ochre, with brown spots on the basal segment and dark ochre-orange zebra-like pattern on their distal segments. Palp small and short (Figs. 1, 8), with a relatively long trochanter, ventrally armed with one spine-tipped tubercle. Femur ventrally with rare small spine-tipped tubercles. All segments covered with hairs and setae. Tarsus with a smooth claw, its internal surface bears microdenticles along almost its entire length. Length of palpal segments: Fm 1.39, Pt 0.70, Tb 0.91, Tr 1.51, total length 4.51. Palps light ochre, with small, oval, ochre and dark ochre spots. Legs relatively short (Fig. 1), cylindrical in cross section. First pair of legs slightly swollen. Third and fourth pairs of legs noticeably swollen and nicely armed, especially the coxa IV, femora, patellae and tibiae; their femora ventrally with rows numerous of spine-tipped tubercles, lateral and dorsal surfaces with longitudinal rows of black-tipped denticles; patellae and tibiae ventrally armed with acute tubercles, laterally with black-tipped denticles, dorsal surfaces without arming, distal edge of this segments with separated acute tubercles directed anteriad. Metatarsi ventrally with

rows inclined denticles. Internal edge of coxa IV covered the tiny denticles, in dorsal view. Legs I-II weakly armed; their femora with longitudinal rows of black-tipped denticles; patellae and tibiae with setae only. Metatarsi ventrally with spicules. Length of legs: I $2.43 + 1.34 + 1.92 + 2.20 + 4.67 = 12.56$, II $3.82 + 1.50 + 3.52 + 3.08 + 7.61 = 19.53$, III $2.63 + 1.42 + 2.15 + 2.92 + 4.86 = 13.98$, IV $3.77 + 1.68 + 3.03 + 4.37 + 5.22 = 18.07$. Legs IV darker than the body, ochre-orange; I-III ochre or light ochre. All legs with numerous small, oval, brown spots.

Penis (Figs. 4–5) with the extended corpus. Corpus from base gradually widens towards its middle part and narrowed to glans. Corpus in distal part with wing-shaped lateral keels. Glans (Fig. 9) distally without spicules. Length of penis 2.98, width of base 0.24.

Coloration: Body light ochre color, with many light brown specks and splotches. Saddle are visible from above with light brown and brown pattern and spots. Eye tubercle above lighter than a body, with brown eye rings. Chelicera ochre with ochre-orange and ochre-brown spots, distal segment on sides with zebra-like ochre-orange pattern. Palps, I-III legs are light ochre or ochre. IV legs darkest than others are ochre-orange. All limbs with numerous ochre-orange or ochre-brown spots.

Variation: Samples of *Egaenus turkmenicus* sp. n. can vary in sizes, but the main characteristics of this species remain invariable.

Female (paratype). Body 6.79 long, width 4.43. Cephalothorax length 1.54, clypeus 0.92. Eye tubercle width 0.48 mm. General appearance similar to that of the male (Fig. 2). Body usually larger than in males. Chelicerae normal structure, not swollen. Length of basal segment 1.47 and distal segment 1.13, length of chela 0.58. Limbs without armature as in males. Length of palpal segments: Fm 1.69, Pt 0.56, Tb 0.73, Tr 1.18, total length 3.53 mm. Legs III and IV slender, not swollen, their femora and patellae with spine-tipped tubercles on the top. Length of legs: I $2.21 + 1.02 + 1.59 + 1.61 + 2.84 = 9.27$, II $3.17 + 1.19 + 2.42 + 2.05 + 5.28 = 14.11$, III $2.31 + 0.99 + 1.72 + 2.23 + 3.46 = 10.71$, IV $3.44 + 1.42 + 2.48 + 3.61 + 4.64 = 15.59$.

Ovipositor normal in structure, seminal receptacles (Fig. 3) found between 5th to 7th segments.

Material. Turkmenistan. 1♂ (holotype), 2♂, 1♀ (paratypes): ca. 40 km SW of Pulikhatum, foothills of Zulfagarsky Mt. Range, 1000 m a.s.l., 13–14 April 1993, D.V. Logunov leg.; (ISEA). Other paratypes: 1♂: same locality as that of the holotype, 14 April 1993, S. Ovchinnikov leg.; 1♂, same locality, 1000–1100 m a.s.l., 15 April 1993, D.V. Logunov leg.; 1♀, Bolshoi Balkhan Mt., c. 6 km NE of Nedit-Dagh, 1 April 1993, S. Ovchinnikov leg.; 1♂, ca. 8 km N of Kushka (=Gushgy), Morgunovka Vil., 9–19 April 1993, D.V. Logunov leg.; 1♂, 1♀, SW Kopetdag Mts, ca. 10 km SE of Kara-Kala (=Garrygala), 28–29 April 1993, D.V. Logunov leg.; 1♂: same locality, 28–29 April 1993, D.V. Logunov leg.; 3♂, 1♀, same locality, 29 March 1993 S.V. Ovchinnikov leg.; 1♂, Chuli, 14 April 1991, S.V.

Lukyantsev leg. (all the specimens from ISEA).

Etymology. The specific epithet refers to the county, in which this species was collected.

Diagnosis. *Egaenus turkmenicus* sp. n. is closest to *Egaenus oedipus* (Thorell 1876). For diagnostic characters between these species see Table 1.

Graecophalangium karakalensis sp. n.

(Figs. 10–26, 35)

Male (holotype). Body length 5.5, width 4.0. Body quadrangular, with double-triple transverse rows of black-tipped denticles on each tergites (Fig. 10). Ocularium relatively broad, with 9–10 black tipped denticles on each side. Surface in front of and on each side of ocularium densely covered with large black-tipped denticles. Each side of the carapace also with black-tipped denticles. Venter with bristles. Carapace dirty grey, with dark brown saddle-pattern. Surface in front of ocularium dark brown. Venter dirty grey, coxae and genital operculum darker, with brown spots of different sizes. Legs dirty grey. Chelicera large and robust (Figs. 11–13). Segment I dorsally with a group of hair-tipped denticles. Segment II with large blunt cone-shaped tubercle. At the basis of internal digit a long blunt straight apophysis is situated; both digits with distal blunt cone-shaped apophyses. Basal segment 2.0 mm, distal 3.0 mm long. Chelicera brown, with dark brown spots. Palps short and robust; femur dorsally and ventrally with large and small hair-tipped denticles and bristles; patella dorsally with row of large and small hair-tipped denticles; tibia and tarsus with setae (Figs. 14–16). Palps dark brown. Length of palpal segments: Fm 2.1, Pt 1.25, Tb 1.3, Tr 2.25, total length 6.9. Legs short, first pair thickened; femora of all legs with transverse rows of large denticles; Pa and Ti with small denticles. Length of legs: I $4.35 + 1.5 + 3.3 + 4.5 + 6.0 = 19.65$, II $6.5 + 1.75 + 5.75 + 7.0 + 11.0 = 32.0$, III $4.5 + 1.5 + 4.0 + 5.0 + 6.5 = 21.5$, IV $6.25 + 1.75 + 4.75 + 4.25 + 12.5 = 29.5$.

Penis wide at the basis and narrow to top, with small wings (Figs. 17–20). Corpus yellow, wings dark-brown color. Length of the penis 3.6, glans 0.5, stylus 0.2.

Coloration: Carapace basically orange-brown color and light ochre on sides by the coxae of II and III legs, with many brown and dark brown specks and splotches. Eye tubercle above lighter than a body, with brown eye rings. Abdomen light grey-ochre with brown saddle and spots.

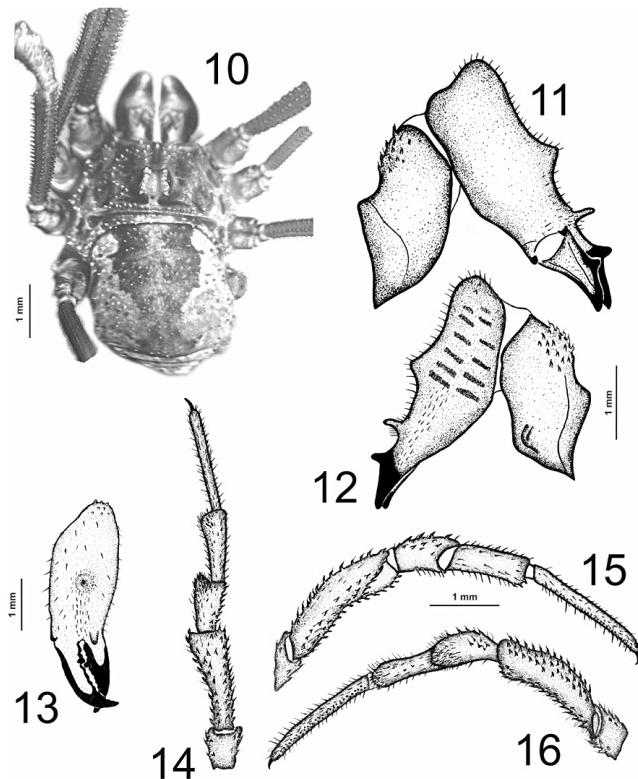


Fig. 10–16. *Graecophalangium karakalensis* sp. n.: 10 — male body, dorsal view; 11–12 — male chelicerae, lateral view (11, ectal; 12 mesal); 13 — distal segment of male chelicera, dorsal view; 14 — male palp, dorsal view; 15–16 — male palp, lateral view (16, mesal; 15, ectal).

Chelicera ochre with brown and dark brown spots, distal segment on sides with zebra-like dark brown pattern. Limbs are orange-brown. Coxae, trochanters, patellae and tibiae of I–IV legs are light ochre with numerous brown or dark brown spots.

Female (paratype). Body length 9.0, width 4.4. Female differs from male in larger body size and more rounded body shape (Fig. 21), the absence of apophyses on chelicerae, smaller sizes of palps (Figs. 22–23) and chelicerae (Figs. 24–25). Basal segment of chelicera 1.5, distal 2.1. Length of palpal segments: Fm 1.6, Pt 1.0, Tb 1.0, Tr 1.9, total length 5.5 mm. Length of legs: I $3.0 + 1.2 + 2.5 + 2.8 + 4.5 = 14.0$, II $4.5 + 1.2 + 3.7 + 4.2 + 8.3 = 21.9$, III ---, IV $5.0 + 1.5 + 3.6 + 5.5 + 7.3 = 22.9$.

Seminal receptacle normal in structure (Fig. 26).

Table 1. Diagnostic characters and distribution of *Egaenus turkmenicus* n. sp. and *E. bajsun* Starega & Snegovaya 2008.

Species	<i>E. turkmenicus</i> sp. n.	<i>E. bajsun</i>
Legs	III and IV pair noticeably swollen and nicely armed (Fig. 1)	III and IV not swollen, poorly armed as other segments (Starega & Snegovaya, 2008)
Chelicerae	Large and robust, swollen (Figs. 1, 6–7)	Small, not swollen (Starega & Snegovaya, 2008: figs. 1–2)
Palp	Only femur armed, dorsally and ventrally with irregular small tubercles (Figs. 1, 8)	Femur, patellae and tibiae armed with small tubercles and black-tipped denticles (Starega & Snegovaya, 2008: figs. 1–2)
Penis	Corpus slightly expanded in its middle part, wing-shaped lateral keels do not approach to the glans (Figs. 4–5, 9)	Corpus gradually narrowed to glans, wing-shaped lateral keels reach the glans (Starega & Snegovaya, 2008: figs. 4–5)
Distribution	Turkmenistan	Southeastern Uzbekistan

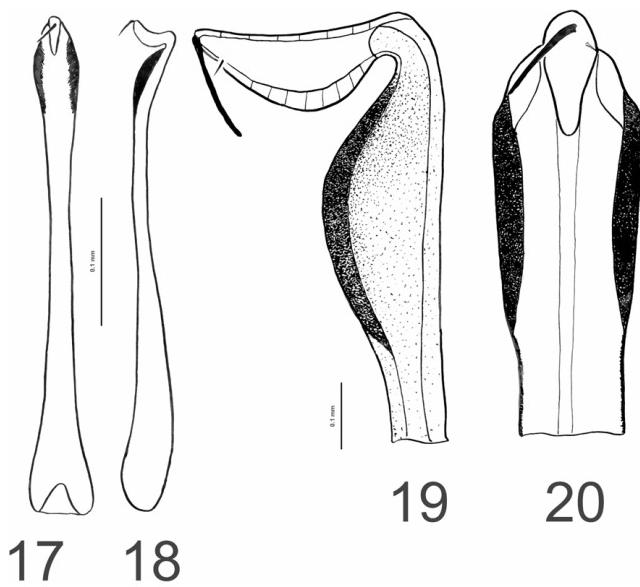


Fig. 17–20. *Graecophalangium karakalensis* sp. n.: 17 — penis, dorsal view; 18 — penis, lateral view; 19 — glans of penis, lateral view; 20 — glans of penis, dorsal view;

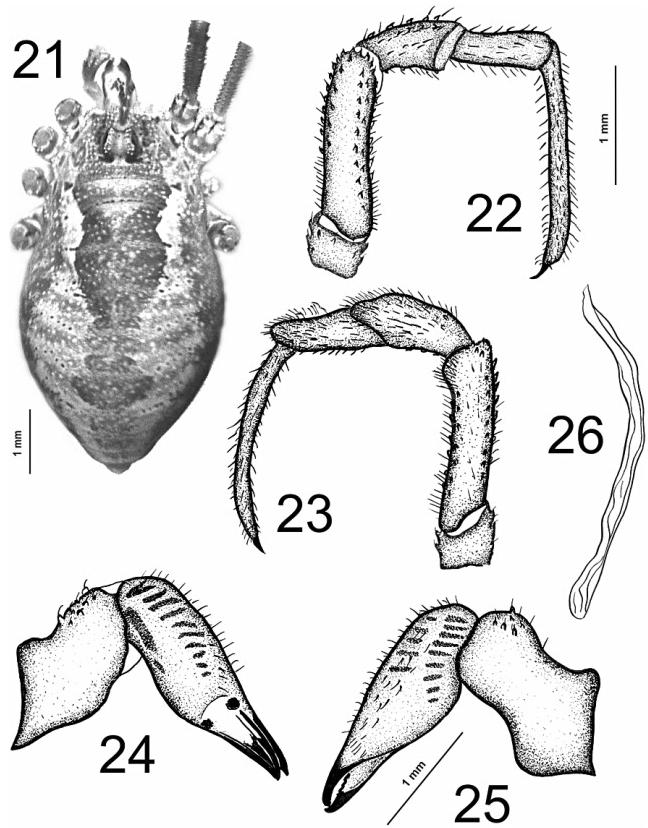


Fig. 21–26. *Graecophalangium karakalensis* sp. n.: 21 — female body, dorsal view; 22–23 — female palp, lateral view; 24–25 — female chelicerae, lateral view (24, ectal; 25, mesal); 26 — seminal receptacles.

Material. Turkmenistan. 1♂ (holotype), 1♀ (paratype): SW Kopetdagh Mts., N of Kara-Kala (=Garrygala), Kara-Yelchi Mt. Ridge, South slopes of Isak Mt., 3–5 May 1988,

I.V. Muratov leg. (ZMMU). Paratypes: 2♂, SW Kopetdagh Mts., N of Kara-Kala, S slope of Kara-Yelchi Mt. Ridge, near Parkhai, piedmonts, 10–17 May 1990, T. Lukarevskaya leg.; 1♂, SW Kopetdagh Mts., Aidere, ca. 800 m a.s.l., on Acer, 25 April 1980, K.G. Mikhailov leg.; 1♂, 1♀: SW Kopetdagh, Damdom, ca. 800 m a.s.l., 27 April 1985, T. Lukarevskaya leg. (all the specimens from ZMMU).

Etymology. Named after Kara-Kala, the village to which type locality of the species belongs.

Diagnosis. The new species is closest to *Graecophalangium drenskii* Mitov 1995, but differs from it by the next characters: different form and size of apophyses on chelicerae; different form of penis, corpus with small wings; different constitution and arming of the legs (Mitov, 1995: Fig. 1–7).

Phalangium kopetdaghenensis sp. n. (Figs. 27–35)

Male (holotype). Body length 5.51, width 3.53. Body mid-size, some elongated (Fig. 27). Meso-, metapeltidium and abdominal tergites with transverse rows of black-tipped denticles. Cephalothorax length 2.02 mm. ‘Clypeus’ length 0.54. Carapace (Fig. 27) with black-tipped denticles situated in groups as follows: behind the ocularium, on the lateral sides, corners, anterior and posterior edge of the glands, 6–7 near the ocularium closer to the front edge. Glands visible. The ocularium (Fig. 27) dorsally carries two longitudinal rows of 7–8 tubercles. Eye tubercle width 0.76. Supra-cheliceral lamella with acute tubercle. Body dorsally milk-ochre, with a well-marked brown grayish saddle-pattern and round/longated gray brownish spots and patterns on its sides. Chelicera large and robust (Fig. 33). Basal segment 1.83, distal 5.51; length of chela 0.80. Both segment swollen (in dorsal view) dorsally with group of black-tipped denticles on the top. Distal segment frontally armed with numerous large black-tipped denticles, dorsally with a very long slender apophysis. Distal segment twice long as wide. Chelicera basal segment milk-ochre, with brownish spots and patterns; distal segment ochre, with zebra-like brown to dark brown pattern. Palp very long (Fig. 34). Trochanter and femur dorsally with sparse denticles. Patellae slightly swollen in its distal part, with lateral aphophysis. Tibia and tarsus covered throughout with scattered setae. Tarsal claw smooth. Length of palpal segments: Fm 3.27, Pt 1.11, Tb 1.62, Tr 3.68, total length 9.68. Palps light ochre. Legs long (Fig. 27) normal structure, cylindrical in cross section. Femora of all legs with rows of inclined black-tipped denticles, patellae and tibiae laterally and ventrally with same denticles. Length of legs: I $5.02 + 1.44 + 4.38 + 4.72 + 8.58 = 24.14$, II $8.82 + 1.82 + 7.27 + 7.63 + 14.53 = 40.07$, III $4.99 + 1.51 + 4.19 + 5.62 + 9.64 = 25.95$, IV $7.21 + 1.54 + 5.21 + 8.91 + 11.32 = 34.19$. Legs ochre, with small, oval, light brown and brown spots, especially numerous on leg femora, patellae and tibiae.

Penis (Figs. 29–30) with extended base. Corpus

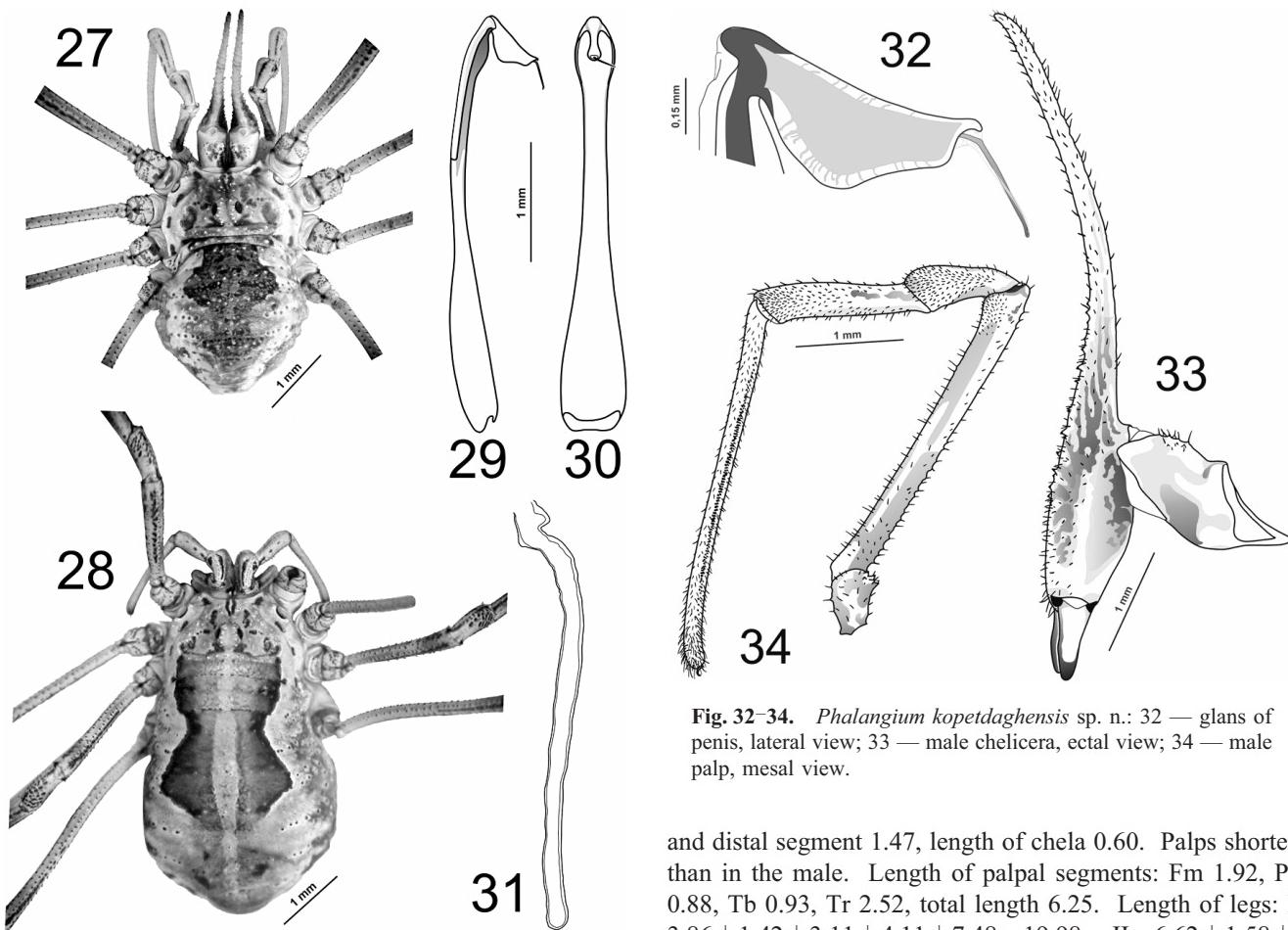


Fig. 27–31. *Phalangium kopetdagensis* sp. n.: 27 — male body, dorsal view; 28 — female body, dorsal view; 29 — penis, lateral view; 30 — penis, dorsal view; 31 — seminal receptacles.

gradually widens towards its base, in distal part with narrow wing-shaped lateral keels, forming a depression in front of the glans. Glans is flattened out laterally, ventrally with visible concavity, distally with a pair of setae (Fig. 32). Length of penis 3.18, width of base 0.50.

Coloration: Body basically milk-ochre color with light brown and brown specks and splotches. Eye tubercle above ochre. Abdomen with dark brown saddle, grey ochre and brown ochre pattern and spots. Chelicera milk-ochre with brown and dark brown spots, distal segment on sides with zebra-like dark brown pattern. Palps are light ochre with dark brown elongated spots. Coxae and trochanters of I–IV legs are milk-ochre with numerous brown or dark brown spots. Femora, patellae and tibiae of all legs are ochre-brown with dark brown elongated and oval splotches.

Female (paratype). Body 8.28 long, with 4.58. Cephalothorax length 1.80. Eye tubercle width 0.62. ‘Clypeus’ length 0.53. Female general appearance is similar to that of the male (Fig. 28). Body usually larger than in males, with an extended abdomen. Chelicerae of typical structure, small and weak. Length of basal segment 1.62

Fig. 32–34. *Phalangium kopetdagensis* sp. n.: 32 — glans of penis, lateral view; 33 — male chelicera, ectal view; 34 — male palp, mesal view.

and distal segment 1.47, length of chela 0.60. Palps shorter than in the male. Length of palpal segments: Fm 1.92, Pt 0.88, Tb 0.93, Tr 2.52, total length 6.25. Length of legs: I $3.86 + 1.42 + 3.11 + 4.11 + 7.48 = 19.98$, II $6.62 + 1.58 + 5.82 + 5.97 + 13.33 = 33.32$, III $3.88 + 1.41 + 3.18 + 6.03 + 8.03 = 22.53$, IV $6.39 + 1.45 + 4.38 + 7.92 + 10.96 = 31.1$.

Seminal receptacle normal in structure found between 4th to 9th segments (Fig. 31).

Material. Turkmenistan. 1♂ (holotype): SW Kopetdagh Mts., c. 10 km SE Kara-Kala (=Garrygala), 28–29 April 1993, D.V. Logunov leg. (ISEA). Paratypes: 4♂, 2♀, same locality 28–29 April 1993, D.V. Logunov leg.; 7♂, 1♀, Gezgyadyk Mt. Range, 20–25 km SE of Pulikhatum, 15–16 April 1993, D.V. Logunov leg. (all the specimens from ISEA).

Etymology. The name of the species originates from its type locality, Kopetdagh Mts.

Diagnosis. The species is most closely related to *Phalangium staregai* (Snegovaya, 2005). For diagnostic characters between these species see Table 2.

Acknowledgments

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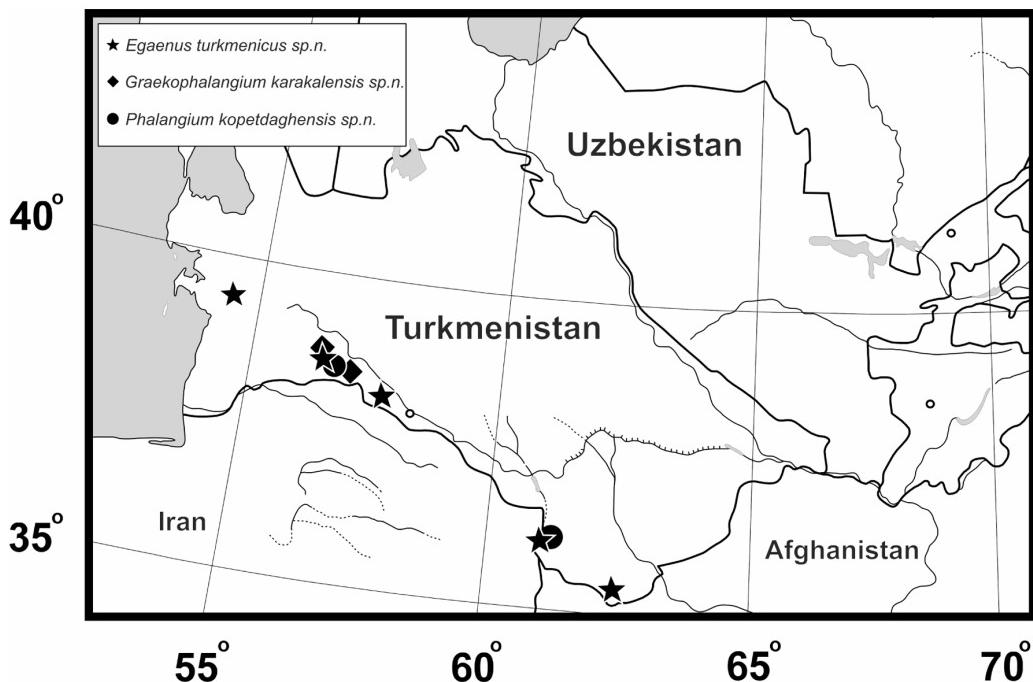


Fig. 35. Distributions of *Egaenus turkmenicus* sp. n., *Graekophalangium karakalensis* sp.n. and *Phalangium kopetdagensis* sp.n.

Table 2. Diagnostic characters and distribution of three species of *Phalangium*.

Species	<i>P. kopetdagensis</i> sp. n.	<i>P. bakuensis</i> Snegovaya 2006	<i>P. staregai</i> Snegovaya 2005
Leg I	Not swollen, normal structure (Fig. 27)	Noticeably swollen (Snegovaya 2006: p. 96)	Noticeably swollen (Snegovaya 2005: p. 29)
Palp	Palps long. Patellae, tibiae and tarsus not armed (Fig. 34)	Palps short. Tibia and tarsus armed scattered inclined black-tipped denticles (Snegovaya 2006, figs. 3–4)	Palps long. Patellae, tibiae and tarsus armed numerous inclined black-tipped denticles (Snegovaya 2005, figs. 51–52)
Penis	Corpus in distal part with narrow wing-shaped lateral keels (Figs. 29–30). Glans ventrally with insignificant concavity (Fig. 32)	Corpus in distal part with wide wing-shaped lateral keels. Glans ventrally without concavity (Snegovaya 2006, figs. 7–10)	Corpus in distal part with wide wing-shaped lateral keels. Glans ventrally without concavity (Snegovaya 2005, figs. 47–50)
Distribution	Turkmenistan	Eastern part of Azerbaijan	Southeastern part of Azerbaijan

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